

REMARKS

Claims 1-19 remain pending in this application.

Objection: Specification

The specification has been amended to clarify the text of the specification at pages 22 and 24. Applicants appreciate the careful attention to these details provided in the Office action.

Rejection: § 112, second paragraph

Claims 6-8 and 15 have been rejected as being indefinite for the alleged failure to provide antecedent basis for certain identified limitations in the claims. While it is recognized that the absence of antecedent support may render a claim indefinite, that is not necessarily the case. As noted in MPEP 2173.05(c), if the scope of the claim is reasonably ascertainable by those skilled in the art, the claim is not indefinite.

It is respectfully submitted that claims 6-8 and 15 are clear and the meaning of each of the terms in these claims is readily ascertainable by those skilled in the art. Claim 6, for example, is directed to a microporous polyolefin film. A person skilled in the art would readily recognize that this is a polyolefin film with pores. The recitation of "the average pore diameter" simply refers to the average pore diameter of the pores in the polyolefin film. It is difficult to imagine why the meaning and scope of this claim is not reasonably ascertainable by those skilled in the art.

Similarly, the reference to the shutdown temperature and the short-circuit temperature would be recognized by those skilled in the art as readily ascertainable characteristics of the recited microporous polyolefin film. Not only are these terms understood by those skilled in the art, as described under Background Art in the present specification (page 2, line 1 to page 3, line 8), but the present specification also

describes the desirable ranges for these characteristics (page 19, lines 10-14) and the procedures that can be used to make these measurements in accordance with the present invention (page 23, line 14 to page 24, line 19). Accordingly, since the shutdown temperature and the short-circuit temperature of the recited microporous polyolefin film would be readily ascertainable by a person skilled in this art, this rejection should be withdrawn.

Finally, the recited "high temperature puncture strength" recited in claim 8 also is a readily ascertainable characteristic that would be recognized by those skilled in the art. Similar to the other characteristics noted above, the values for the high temperature puncture strength are described at page 19, lines 15-18 of the specification, together with a detailed description at page 24, line 20 to page 25, line 6 of the specification of the procedure for determining this characteristic of the recited microporous polyolefin film.

Applicants respectfully submit that claims 6-8 and 15 are clear and in full compliance with § 112, second paragraph. The terms identified by the Office as lacking antecedent basis clearly recite characteristics that are well understood by those skilled in the art and clearly described in the specification disclosure. Accordingly, these rejections should be withdrawn.

Rejection: § 102 Higuchi et al.

Claims 1-3, 5, 9-11, 13, 18 and 19 have been rejected under 35 U.S.C. § 102(b) as being anticipated by Higuchi et al. (U.S. Patent No. 5,824,430). Higuchi et al. is stated to teach a microporous polyolefin film which may comprise two or more layers comprising polyethylene and polypropylene as essential components. The Office considers Higuchi et al. to teach all the limitations of these claims, including the

requirement that at least a surface layer contain 50-95% by weight polypropylene and the content of polyethylene in the entire film is 50-95%. Applicants respectfully disagree that Higuchi et al. contains a disclosure that meets each limitation of these claims.

Higuchi et al. teaches a porous laminate film that comprises at least one porous high molecular weight polypropylene layer and at least one porous layer comprising a material having a melting point from 100° to 140° C, and a Gurley value at 25°C of from 200-1500 (col. 2, line 62 to col. 3, line 2). The latter porous layer may comprise polyethylene or polybutene, but is preferably a blend of 0-60% propylene to 40-100% polyethylene (col. 4, lines 4-15, and line 58 to col. 5, line 6). Note that the amount of polypropylene in this porous layer that may contain a blend of polypropylene and polyethylene overlaps with the recited range only where the polypropylene content is 50-60% of the blend layer.

Although Higuchi et al. teaches that the porous layer having a melting point of from 100-140°C may be polyethylene or a blend of polyethylene/polypropylene, it is never suggested or exemplified that layer (2) in Figs 1(a)-(c) could be different materials. As noted in col. 6, lines 11-23, of Higuchi et al. the proportion of polypropylene layers (1) of the film in Higuchi et al. is 20-99%, whereas the porous layer(s) containing material having a melting point of 100-140° C would constitute 1-80% of the microporous film.

Even with these broad teachings, it is not understood how the Office considers Higuchi et al. to satisfy the limitation that the film contains both (1) polyethylene in an amount of 50-95% and (2) a surface layer that contains polypropylene in an amount of 50-95% by weight. It is noted, for example, that the Office suggests that claim 2 is

anticipated by Higuchi et al. in that it is indicated that at least one layer of the laminate film is a polyethylene single layer film. However, there is no disclosure or suggestion that such a polyethylene layer can or should coexist in the same laminate with at least one surface layer containing 50-95% polypropylene as required by the present claims. In Higuchi et al., polyethylene is suggested as an alternative to the preferred blend of 0-60% polypropylene and 40-100% polyethylene. Accordingly, as Higuchi et al. fails to teach all the limitations of these claims, this anticipation rejection should be withdrawn.

Rejection: § 103 Higuchi et al.

Claims 4, 6-8, 12 and 14-16 have been rejected as being obvious over Higuchi et al. It is apparently the position of the Office that the limitations recited in these claims are either inherent in or obvious over the teachings of Higuchi et al. since the laminate has a composition similar to and it is produced in a similar fashion to the microporous film claimed in this application. It is not understood what the Office means by "similar," but it is clear from the analysis provided above that Higuchi et al. does not teach or suggest a laminate that would fall within the scope of the present claims, and thus could not teach or suggest a microporous polyethylene film that satisfies, inherently or otherwise, the limitations of these claims.

The object of the present invention is to produce a microporous polyolefin film having excellent permeability, a low shutdown temperature, a high short-circuit temperature, high film strength at high temperatures that also excels in high temperature storage (page 6, lines 5-15 of the specification). Applicants have found that these properties can be achieved by observing the recited percentage of polypropylene blended in at least one surface layer, and the recited content of polyethylene in the entire film (page 6, lines 16-25 of the specification). The importance

of observing these parameters is illustrated in the Examples and Comparative Examples present in the specification. See Tables 1, 2 and 3. Since Higuchi et al. provides no teaching, suggestion, or reason to modify the laminate taught in that patent in a manner that would result in the claimed microporous film and battery separator, Higuchi et al. fails to establish a *prima facie* case of obviousness. Accordingly, the rejection should be withdrawn.

Rejection: § 102(b)/§ 103(a) Nishiyama et al.

Claims 1, 3, 5, 6, 9, 11, 13, 14 and 17 have been rejected as being anticipated under 35 U.S.C. § 102(b), and claim 17 as obvious over Nishiyama et al. (U.S. Patent No. 5,731,074). The Office argues that Nishiyama et al. disclose a microporous polyolefin film according to the claimed invention and a lithium-ion battery separator comprising a microporous polyolefin film but do not disclose that the film has the recited degree of blackening of 5% or less. The Office argues that this characteristic is inherent in the teachings of Nishiyama et al. because the materials used and the methods of production are the same as or similar to the disclosed invention.

Nishiyama et al. teaches a laminate wherein the porous inner layer is polyethylene alone or a mixture of polyethylene with one kind of other thermoplastic synthetic resin such as propylene (col. 3, lines 24-31). When the inner layer is a mixture, the proportion of polyethylene in this inner layer is 30-80% by weight (col. 3, lines 32-47). The laminate of Nishiyama et al. also contains a surface layer on each side of the inner layer that contains polypropylene (col. 3, lines 1-10) - no other ingredient is suggested for this surface layer. The claimed invention is thus distinguished from the teachings of Nishiyama et al. at least because there is no teaching or suggestion that the content of polyethylene in the entire laminate film is 50%

or more and 95% or less of that film, and there is no teaching that a surface layer may comprise a mixture of polyethylene and polypropylene. Accordingly, Nishiyama et al. cannot anticipate these claims.

Nishiyama et al. does not teach a battery separator comprising a laminate film that contains polyethylene in an amount of 50% or more and 95% or less and wherein at least one surface layer of the film contains polypropylene in an amount of more than 50% to 95% or less by weight. Nishiyama et al. does not teach these parameters, nor does it provide any reasons to modify the amounts or configuration of the materials used in a way that would result in a battery separator according to claim 17. Accordingly, these rejections should be withdrawn.

Claims 4, 7, 8, 12, 15 and 16 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Nishiyama et al. as applied to claim 1 above. For the reasons discussed above, Nishiyama et al. does not teach the structural and compositional requirements of the claimed polyolefin film and product. Although the Office has taken the position that the limitations of these claims are either inherent in or obvious over the teachings of Nishiyama et al., it is clear that Nishiyama et al. does not teach or suggest a laminate that would fall within the scope of the present claims, and thus could not teach or suggest a microcrystalline polyethylene film that satisfies, inherently or otherwise, the limitations of these claims. Accordingly, this rejection should be withdrawn.

Claims 2, 10, 18 and 19 have been rejected under 35 U.S.C. § 103 as being unpatentable over Nishiyama et al., as applied to claims 1 and 9 above, and further in view of Higuchi et al. The deficiencies of both Nishiyama et al. and Higuchi et al. have

been discussed above. These references, either alone or in combination, do not teach a microporous polyolefin film having the characteristics recited in these claims - content of polyethylene in the entire film is 50% or more and 95% or less, and at least one surface layer of the film having polypropylene in more than 50% by weight and 95% or less. Accordingly, this rejection should be withdrawn.

Prompt and favorable reconsideration is requested.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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